

# **The blood vessels & The Urinary System**

Prepared by : Amal Awad Al-Harbi

# The circulatory system consists of

the blood vascular system

the lymphatic vascular system

composed of

The heart

pumps  
the blood

The arteries

carry oxygenated  
blood and nutrients  
to the tissues

They becomes  
thinner as  
they branch  
forming  
arterioles

The veins

carry  
deoxygenated  
blood, rich in  
carbon dioxide  
and other  
metabolic  
products from  
the tissues to  
the heart

The capillaries

consists of a  
diffuse network  
of thin tubules  
through which  
gas exchange  
between blood  
and tissues takes  
place

# **Structure of the blood vessels**

**All blood vessels have a number of structural features in common.**

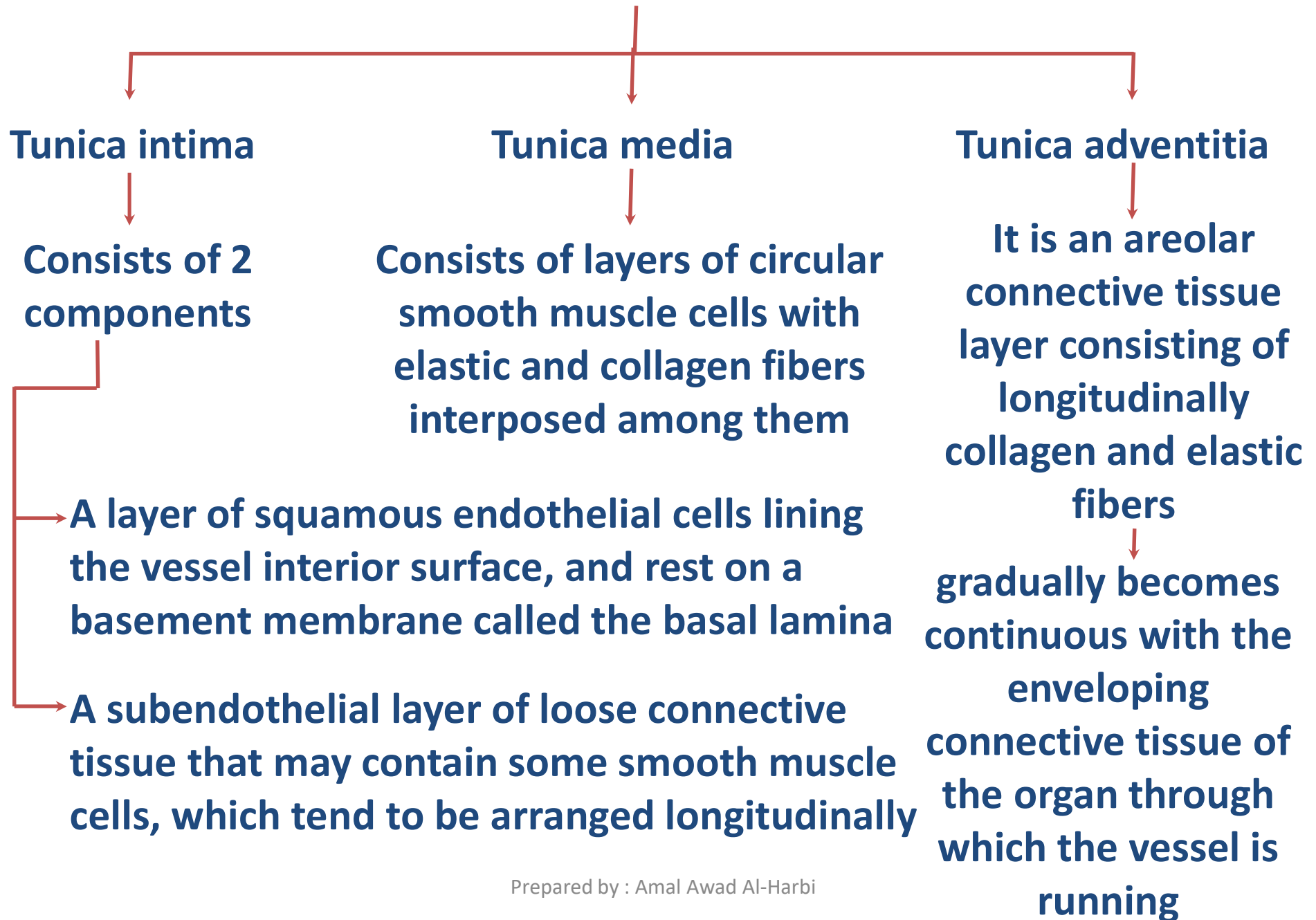
**They are composed of three layers called**

**1- tunica intima**

**2- tunica media**

**3- tunica adventitia**

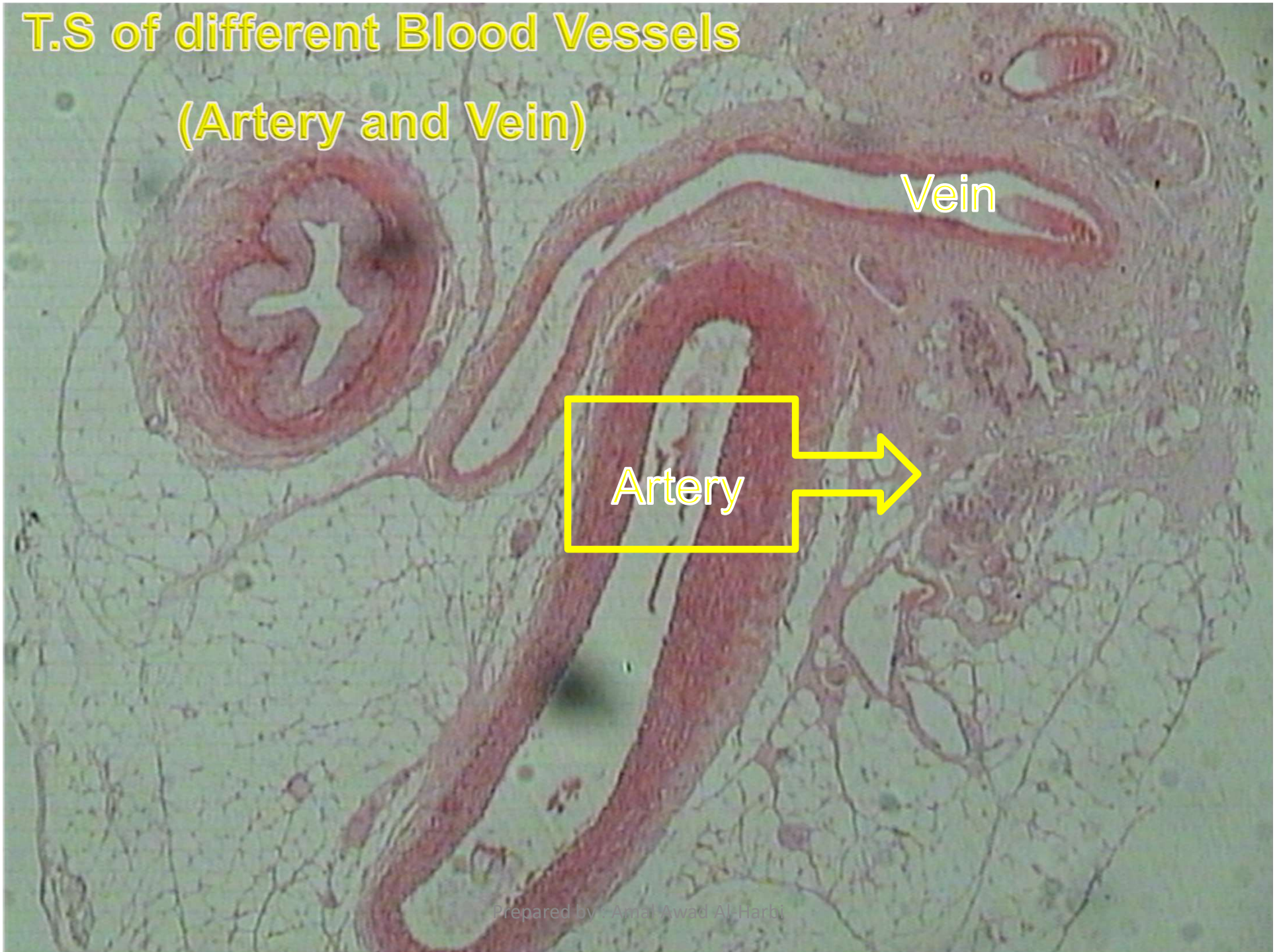
# Structure of the blood vessels



<b>Layer</b>	<b>The artery</b>
<b>Tunica intima</b>	<p>-Consists of 2 components:</p> <p>a) A layer of squamous endothelial cells lining the vessel interior surface, and rest on a basement membrane called the basal lamina.</p> <p>b) A subendothelial layer of loose connective tissue that may contain some smooth muscle cells, which tend to be arranged longitudinally.</p> <p>-Is <b>separated</b> from the media by a well developed layer of <b>elastic connective tissues</b>, called the <b>internal elastic lamina</b>.</p>
<b>Tunica media</b>	<p>-Consists of layers of circular smooth muscle cells with elastic and collagen fibers interposed among them.</p> <p>- <b>The thickest layer</b> of the vessel wall.</p>
<b>Tunica adventitia</b>	<p>-It is an areolar connective tissue layer consisting of longitudinally collagen and elastic fibers.</p> <p>-This layer gradually becomes continuous with the enveloping connective tissue of the organ through which the vessel is running.</p> <p>-<b>Rich in elastic fibers.</b></p>

# T.S of different Blood Vessels

(Artery and Vein)



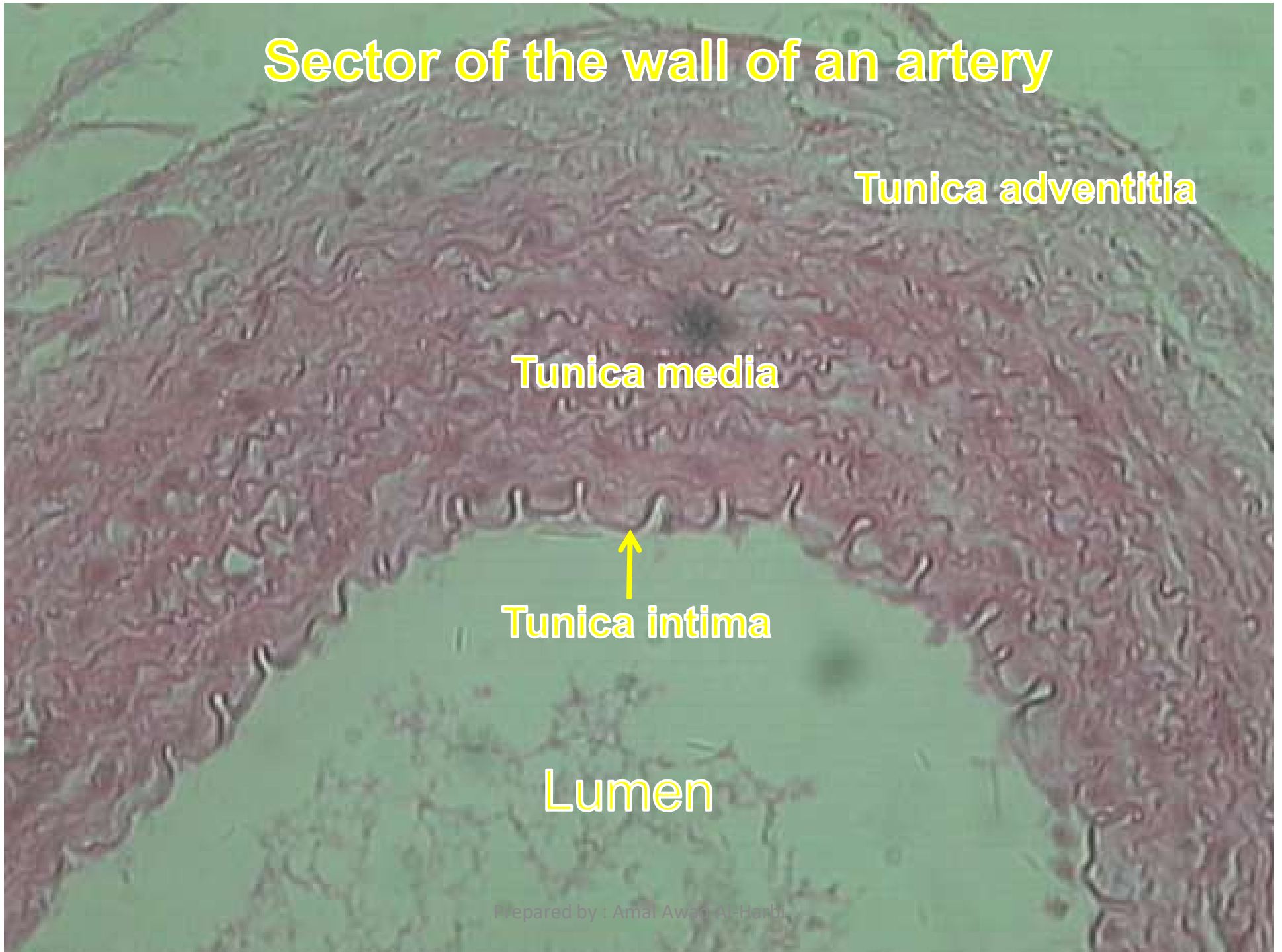
# Sector of the wall of an artery

Tunica adventitia

Tunica media

Tunica intima

Lumen

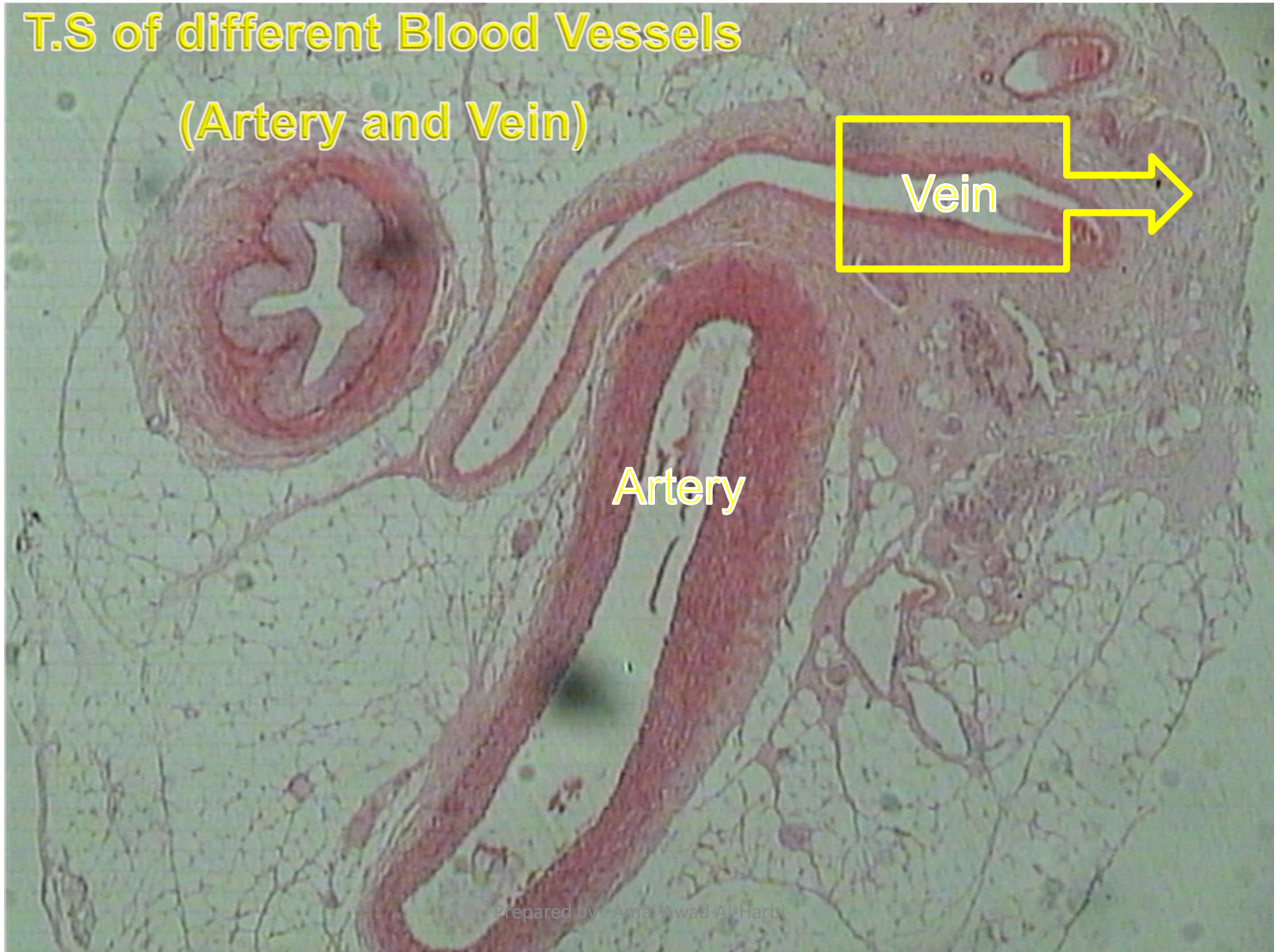


<b>Layer</b>	<b>The vein</b>
<b>Tunica intima</b>	<p><b>-Consists of 2 components:</b></p> <p><b>a) A layer of squamous endothelial cells lining the vessel interior surface, and rest on a basement membrane called the basal lamina.</b></p> <p><b>b) A subendothelial layer of loose connective tissue that may contain some smooth muscle cells, which tend to be arranged longitudinally.</b></p> <p><b>-Is not separated from the media by the internal elastic lamina.</b></p>
<b>Tunica media</b>	<p><b>Consists of layers of circular smooth muscle cells with elastic and collagen fibers interposed among them.</b></p> <p><b>-Much thinner than that of the artery.</b></p>
<b>Tunica adventitia</b>	<p><b>-It is a connective tissue layer consisting of longitudinally collagen and elastic fibers.</b></p> <p><b>-This layer gradually becomes continuous with the enveloping connective tissue of the organ through which the vessel is running.</b></p> <p><b>- Rich in collagenous fibers.</b></p> <p><b>- The thickest layer of the vessel wall.</b></p>

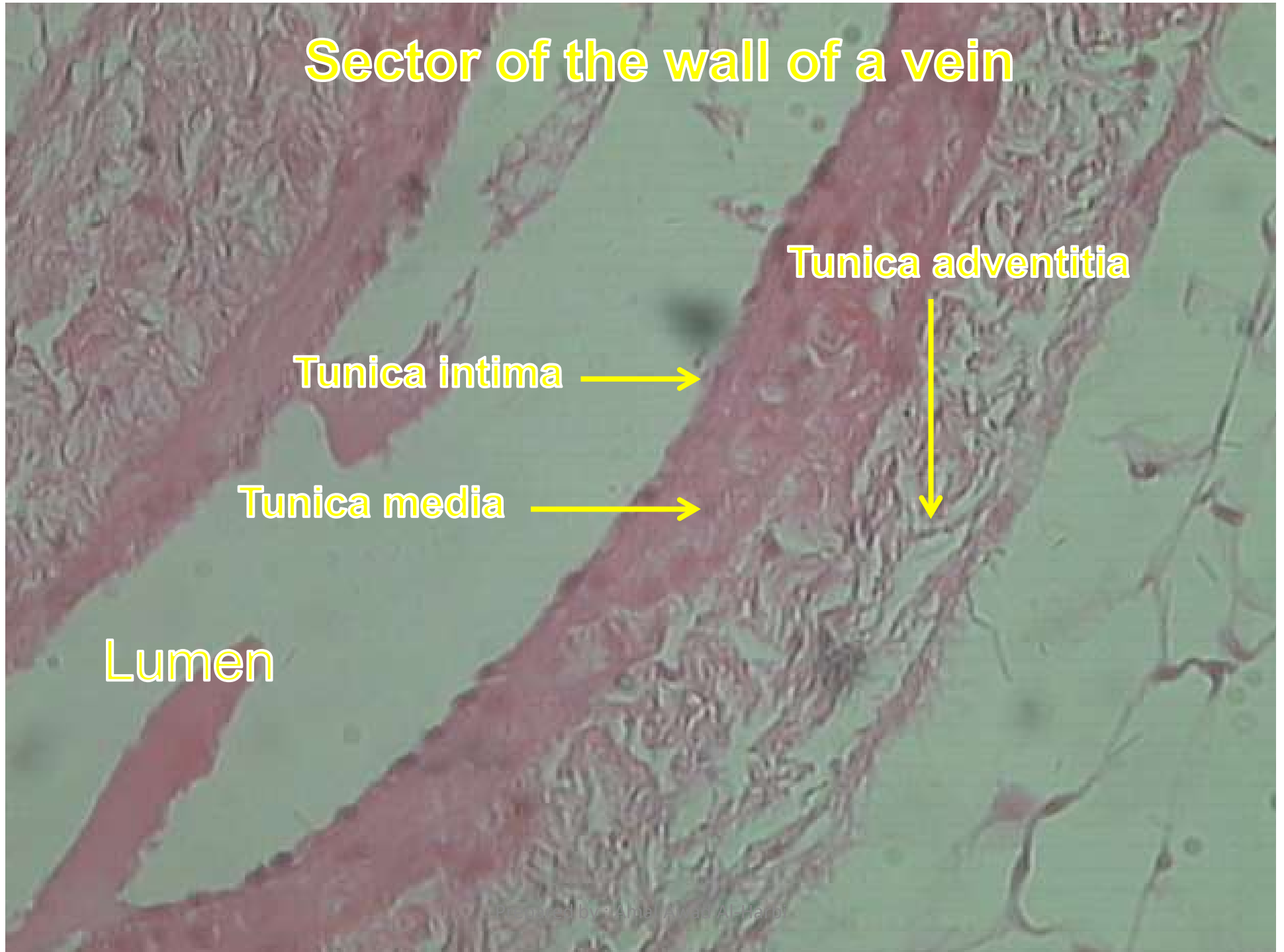


# T.S of different Blood Vessels

(Artery and Vein)



# Sector of the wall of a vein

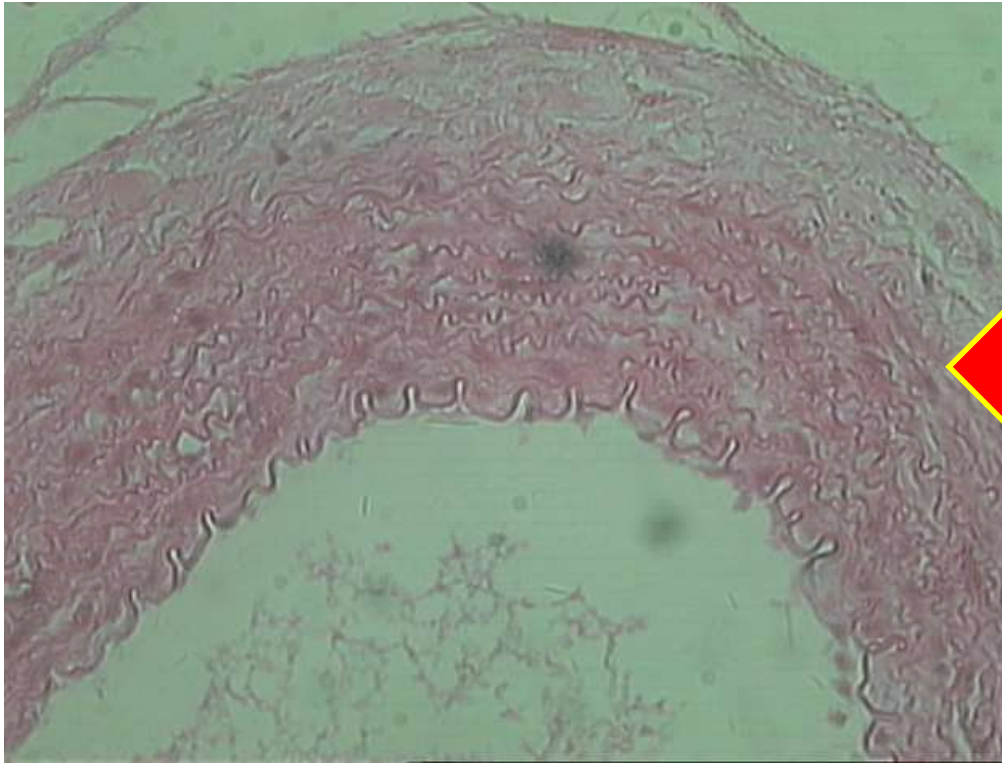


Tunica adventitia

Tunica intima →

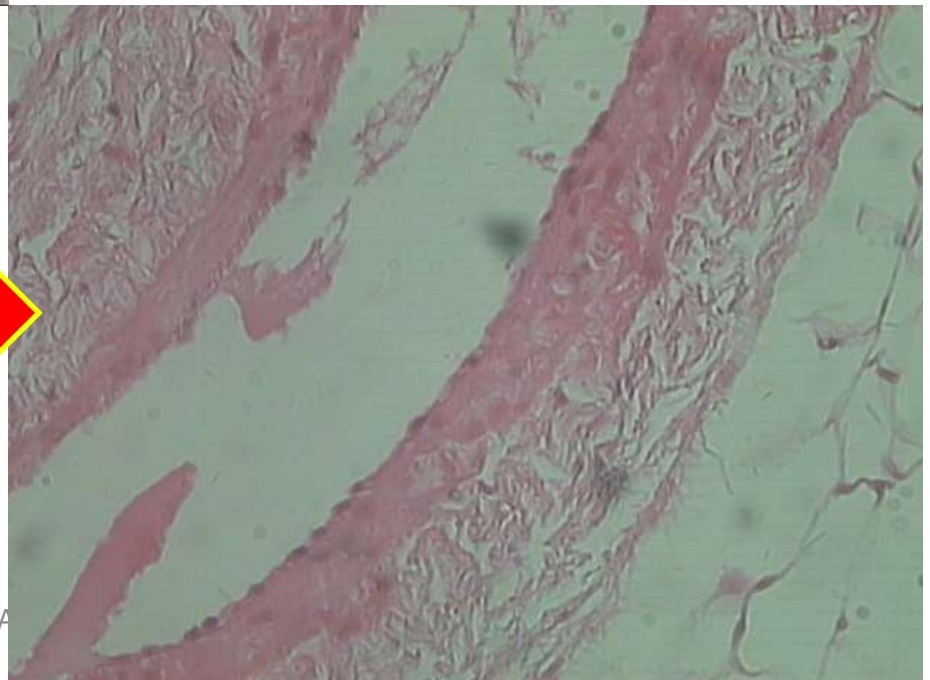
Tunica media →

Lumen



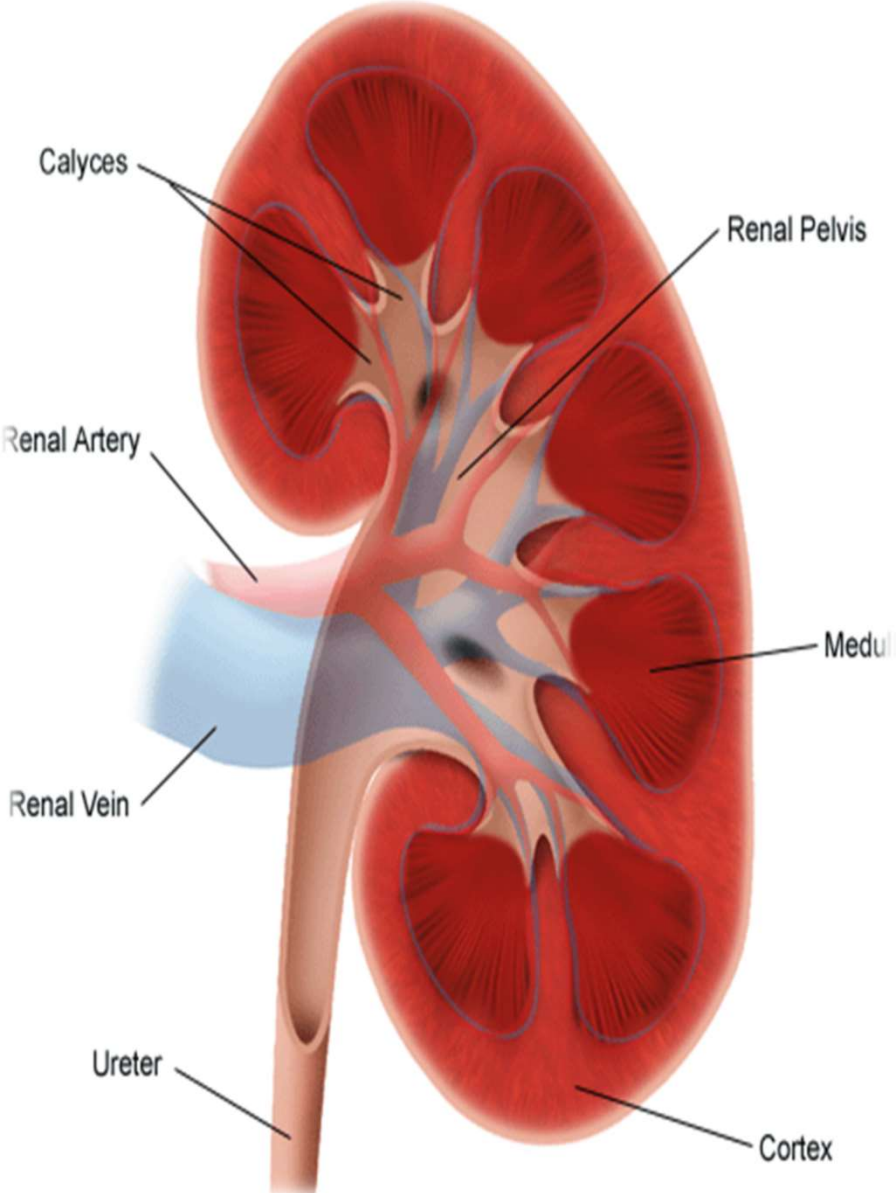
**Sector of the wall of an artery**

**Sector of the wall of a vein**



Layer	The artery	The vein
<b>Tunica intima</b>	<p>-Consists of 2 components:</p> <p>a) A layer of squamous endothelial cells lining the vessel interior surface, and rest on a basement membrane called the basal lamina.</p> <p>b) A subendothelial layer of loose connective tissue that may contain some smooth muscle cells, which tend to be arranged longitudinally.</p> <p>-Is <b>separated</b> from the media by a well developed layer of <b>elastic</b> connective tissues, called <b>the internal elastic lamina</b>.</p>	<p>-Consists of 2 components:</p> <p>a) A layer of squamous endothelial cells lining the vessel interior surface, and rest on a basement membrane called the basal lamina.</p> <p>b) A subendothelial layer of loose connective tissue that may contain some smooth muscle cells, which tend to be arranged longitudinally.</p> <p>-Is <b>not separated</b> from the media by the internal elastic lamina.</p>
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<b>Tunica adventitia</b>	<p>-It is an areolar connective tissue layer consisting of longitudinally collagen and elastic fibers.</p> <p>-This layer gradually becomes continuous with the enveloping connective tissue of the organ through which the vessel is running.</p> <p>-<b>Rich in elastic fibers.</b></p>	<p>-It is a connective tissue layer consisting of longitudinally collagen and elastic fibers.</p> <p>-This layer gradually becomes continuous with the enveloping connective tissue of the organ through which the vessel is running.</p> <p>- <b>Rich in collagenous fibers.</b></p> <p><b>The thickest layer</b> of the vessel wall.</p>

# The Urinary System



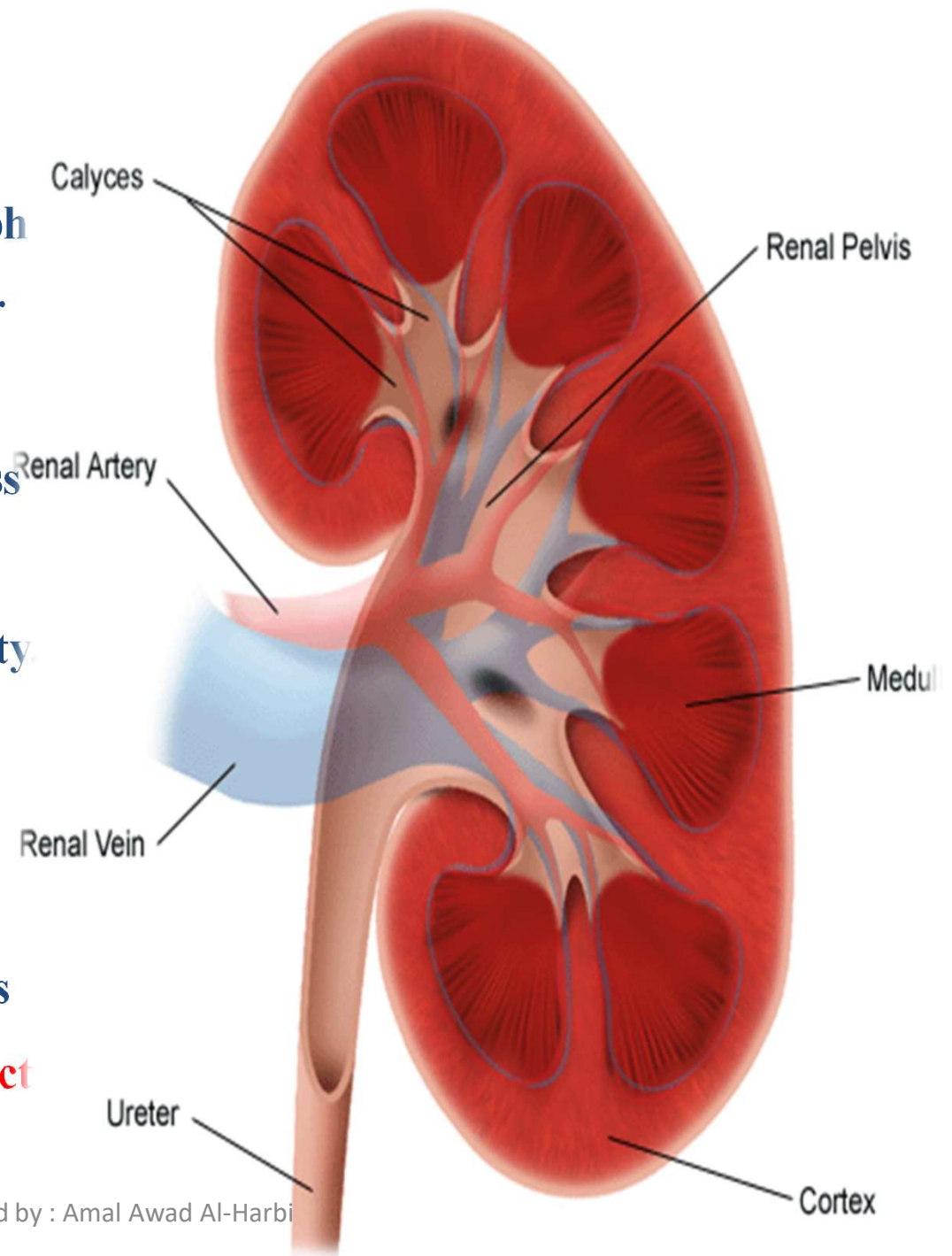
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\*The kidney is **bean-shaped** with a concave medial border , the **hilum** (where nerves enter, blood and lymph vessels enter and exit and the ureter exits) and a convex lateral surface.

\*The kidney is surrounded by a mass of **adipose tissue**.

\*The kidney tissue surrounds a cavity **the renal pelvis**. This pelvis is the expanded upper end of the ureter.

\*The functional unit of the kidney is **the uriniferous tubule** which consists of the **nephron** and the **collecting duct** into which the renal tubule empties its contents.



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**The kidney tissue can be divided into :**

**An outer ,  
granular appearing**

**cortex**

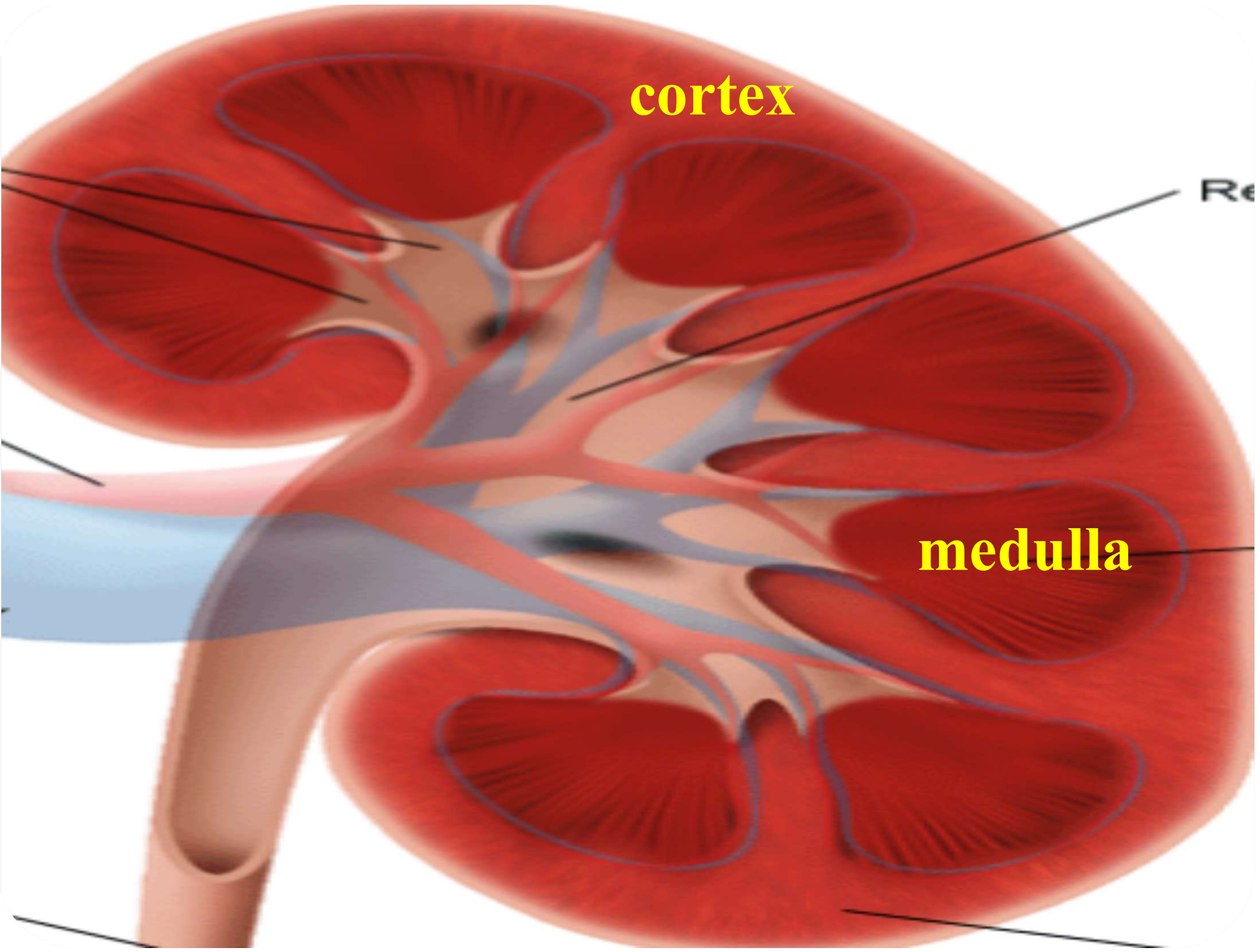
**An inner ,  
striated appearing**

**medulla**

**cortex**

**medulla**

Re

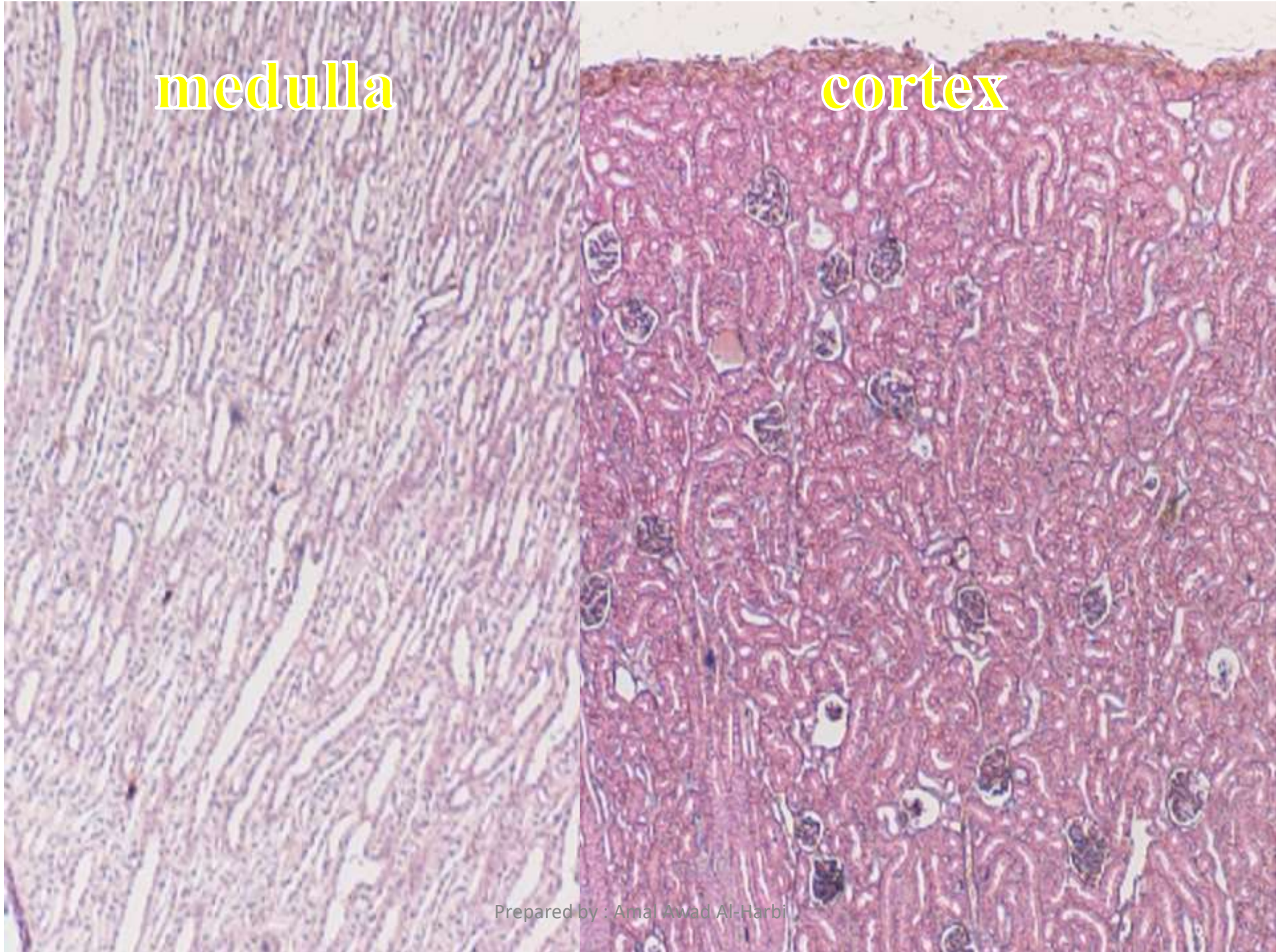




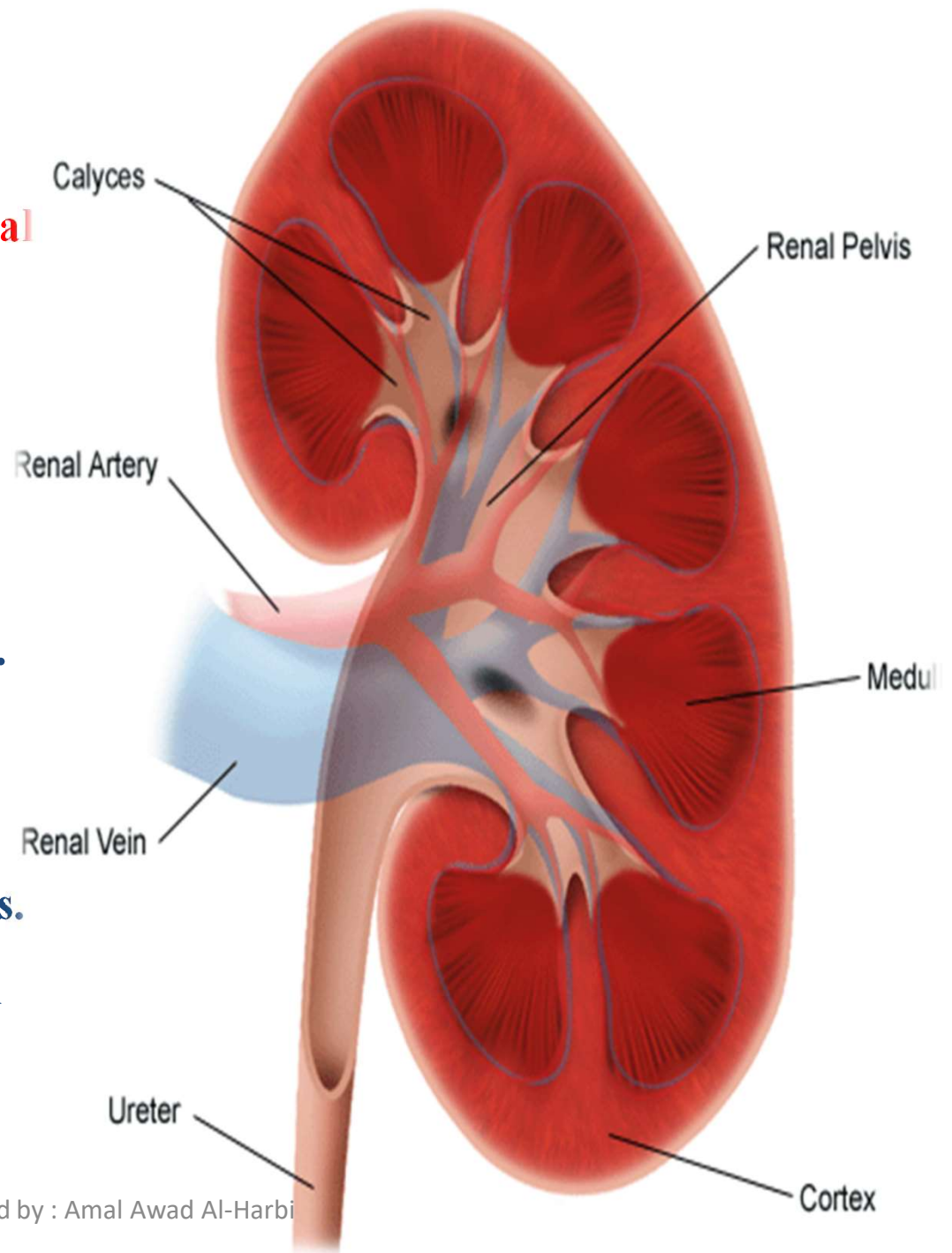
**medulla**

**cortex**

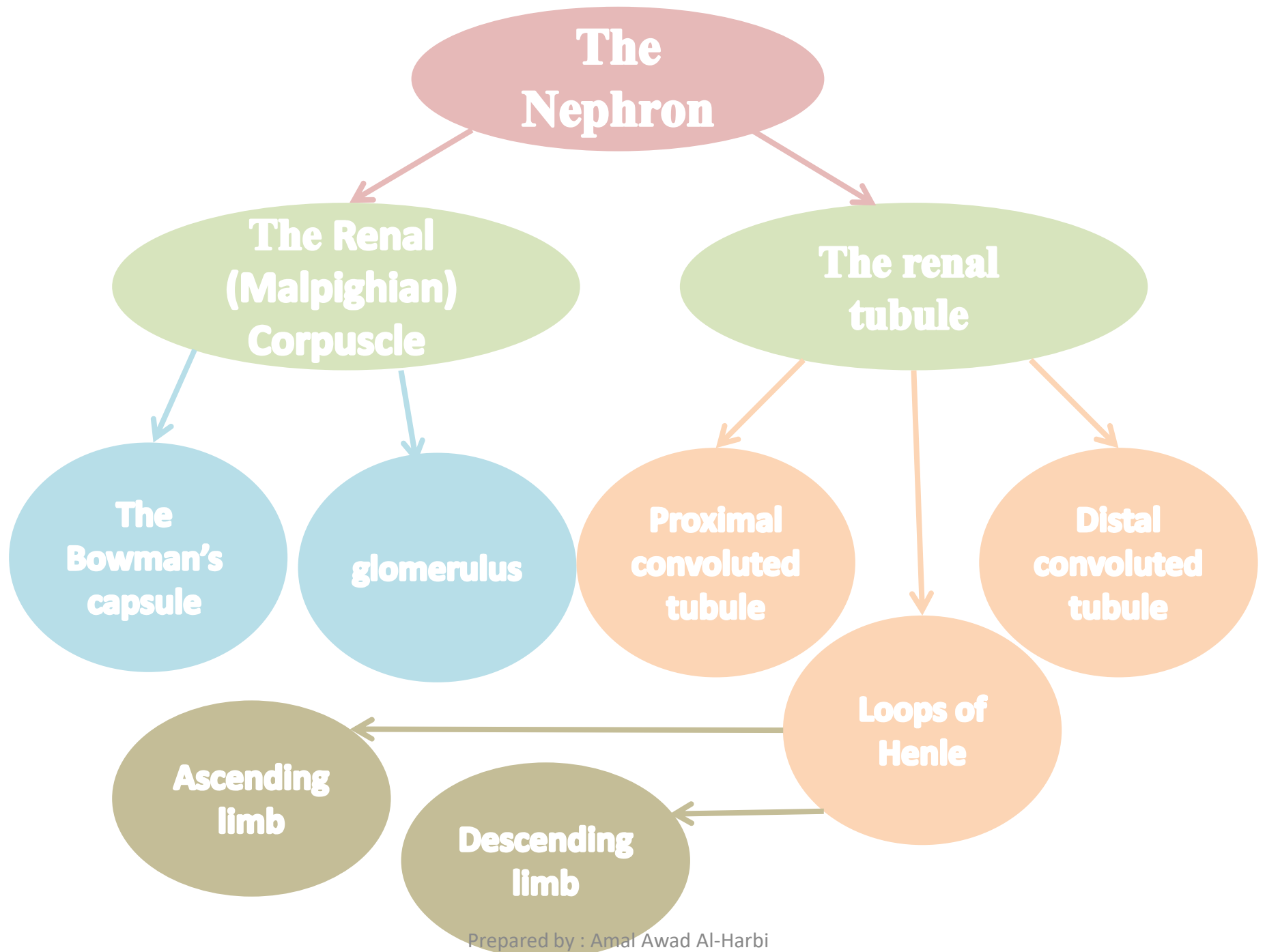
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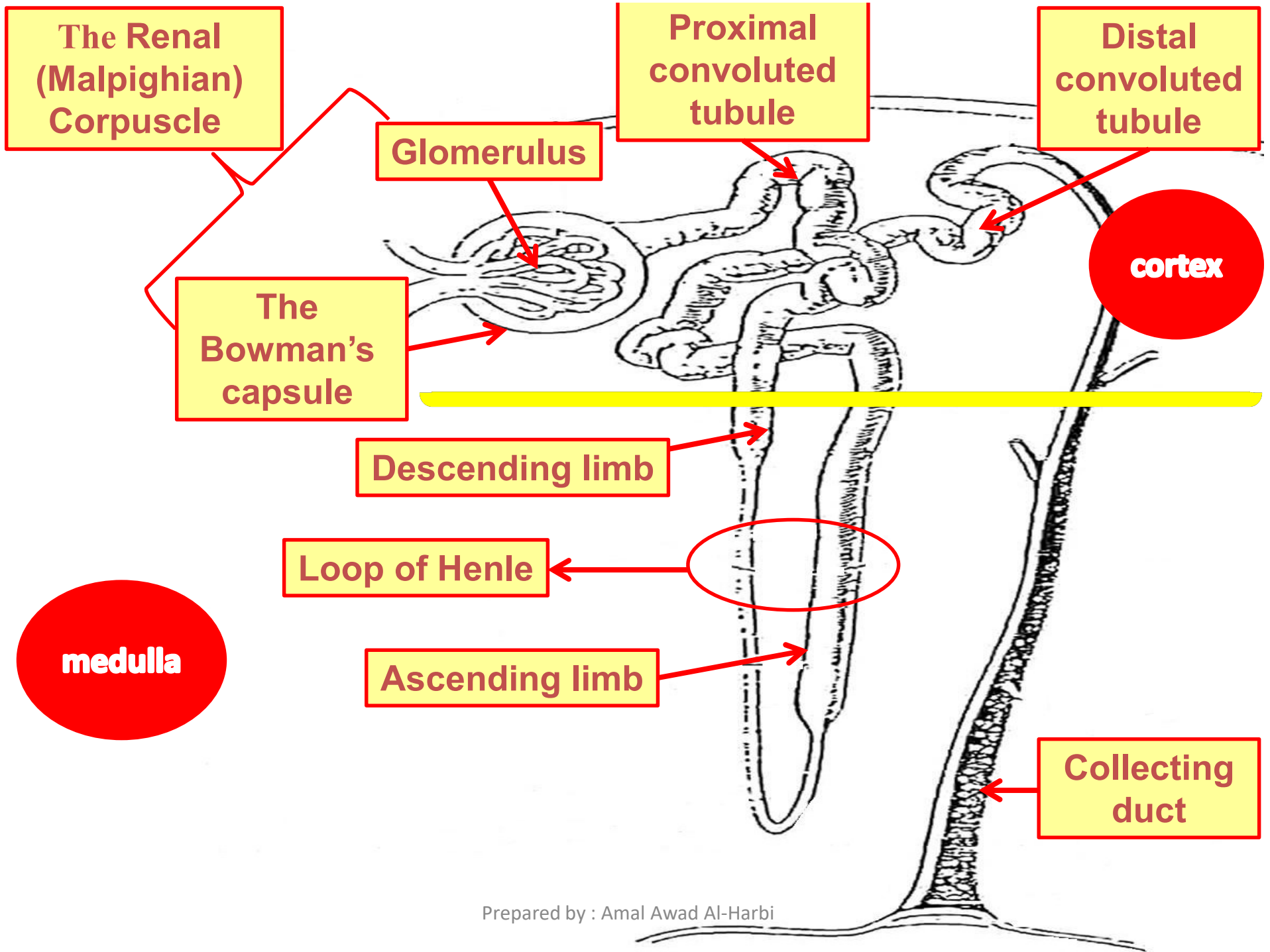


- The human medulla, has 10-18 **medullary pyramids**.
- The pyramid tips are called the **renal papillae** and each is perforated by 10-25 orifices, the opening of the collecting ducts. From the bases of each medullary pyramid, parallel medullary rays penetrate the cortex. Each ray consists of one or more collecting tubules together with the straight portions of several nephrons.
- Surrounding each medullary ray in the cortical region are the renal corpuscles and convoluted portions of the nephron.



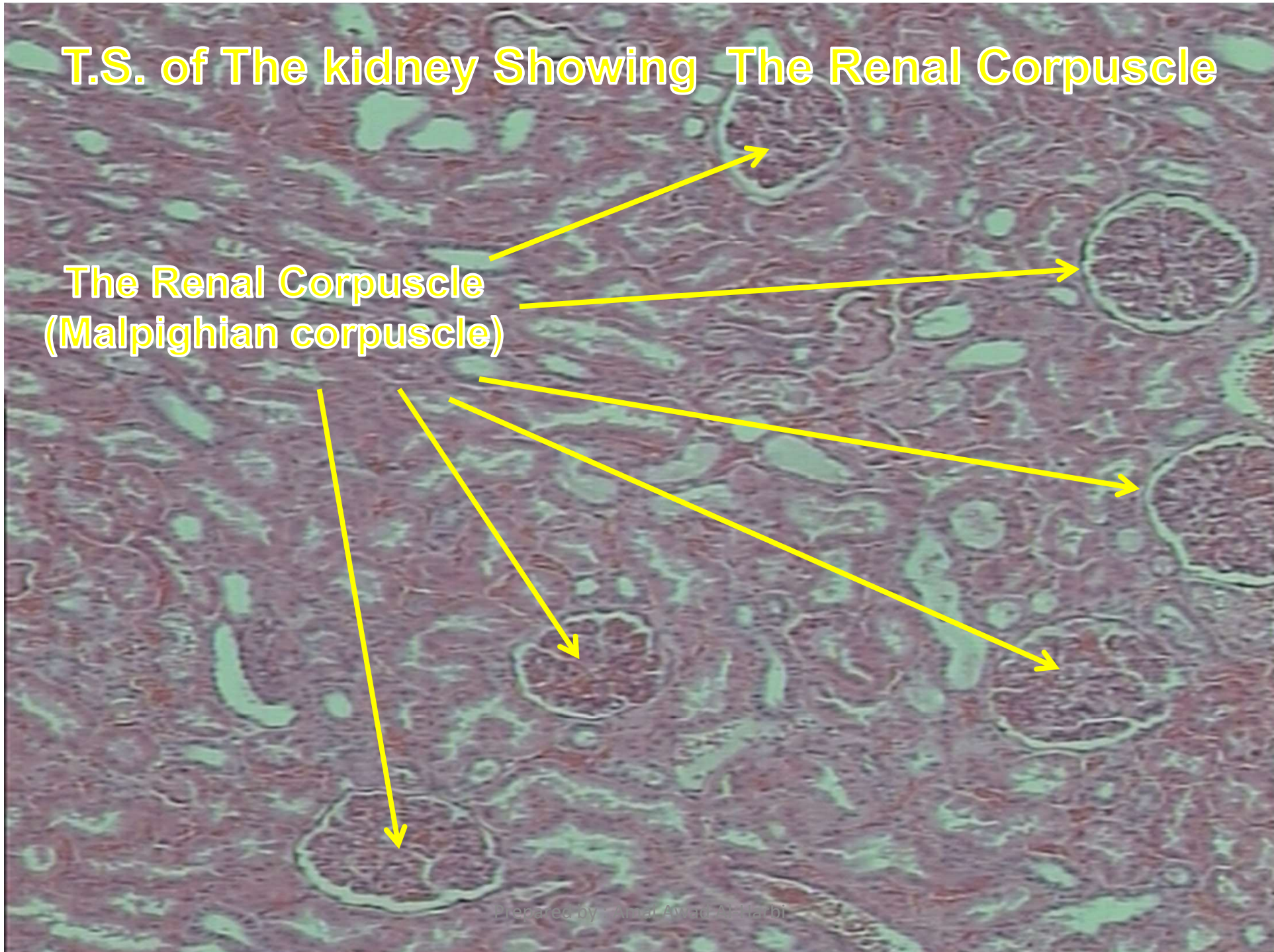
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# T.S. of The kidney Showing The Renal Corpuscle

The Renal Corpuscle  
(Malpighian corpuscle)



# T.S. of The kidney Showing The Renal Corpuscle

Glomerulus

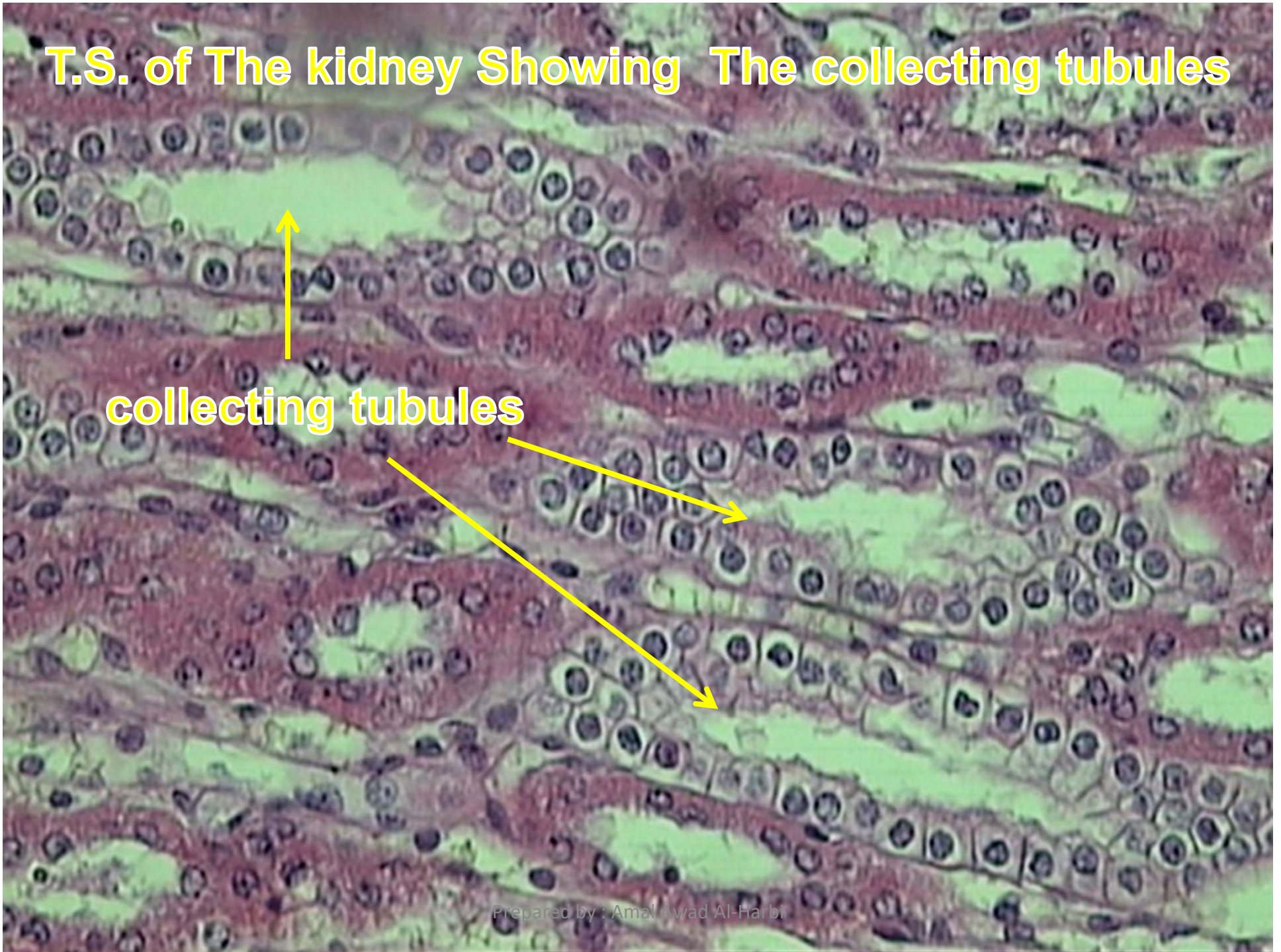


The Renal Corpuscle  
(Malpighian corpuscle)

The  
Bowman's  
capsule



# T.S. of The kidney Showing The collecting tubules



collecting tubules



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